Exercise 13.1: Allocation Rules

Recall

- allocation rule: $x(v) = \mathbf{Pr}[\text{bidder wins with value v}]$
- probability of winning: $\mathbf{E}_{v \sim F}[x(v)]$
- expected welfare: $\mathbf{E}_{v \sim F}[v\, x(v)]$

Exercise 13.1: Allocation Rules

Setup:

- bidder's value is $v \sim U[0, 1]$
- allocation rules for mechanisms A and B

$$x_A(v) = v \qquad\qquad x_B(v) = \begin{cases} 1 & \text{if } v > 1/2 \\ 0 & \text{otherwise.} \end{cases}$$

Questions:

- In mechanism A, what is probability of winning? expected welfare?
- In mechanism B, what is probability of winning? expected welfare?

Lecture 13: Revenue Maximization (Cont.)

Course work:

- Peer Review 3 due tonight (Monday).
- Quiz 1, Weeks 1-3, released tonight, due Wednesday night.
- Project 4 assigned Wednesday night.

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Last Time:

- second-price auction with reserve
- revenue of auctions

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Last Time:

- second-price auction with reserve
- revenue of auctions

Today:

- revenue of auctions (cont).
- virtual values.
- truthfulness and the revelation principle.
- optimization of truthful auctions.
- optimal first-price auctions.

Exercise 13.2: Optimal Pricing, Redux

Exercise 13.2: Optimal Pricing, Redux

Setup:

- you have one item to sell.
- you have value 1 for keeping the item.
- buyer with value from exponential distribution

$$F(z) = 1 - e^{-z} \qquad\qquad f(z) = e^{-z}$$

Questions:

- what price should you offer to maximize your expected utility (your revenue if you sell, or your value if you keep the item)?